

Patent

Customer No.: 006980

Express Mail No.: EL682511852US

Express Mail Date: 28 November 2000

Docket No.: Focke11

Document No.: 651357

APPLICATION FOR LETTERS PATENT
UNITED STATES OF AMERICA

Be it known that we, Heinz Focke, a citizen of Germany, residing at Moorstraße 64, Verden 27283, Germany and Martin Stiller, a citizen of Germany, residing at Döhlberger Straße 35, Verden 27283, Germany, have invented certain new and useful improvements in a

PROCESS AND APPARATUS FOR PRODUCING HINGE-LID
BOXES FOR CIGARETTES

of which the following is a specification.

TROUTMAN SANDERS LLP
Bank of America Plaza, Suite 5200
600 Peachtree Street, N.E.
Atlanta, Georgia 30308-2216 USA
404.885.2773

Field of the INvention

A Description

The invention relates to a process for producing (dimensionally stable) packs made of (thin) cardboard with an outer wrapper made of thin film, in particular a hinge-lid box for cigarettes. The invention also relates to an apparatus for producing such packs and/or for carrying out the process.

7 BACKGROUND OF THE INVENTION

It is common in packaging technology to provide dimensionally stable packs, consisting in particular of cardboard, with an outer wrapper made of thin, transparent film. Such an outer wrapper is common, in particular, in cigarette packs of the hinge-lid type. Before the pack is opened for the first time, the outer wrapper, which is usually provided with a tear-open strip, is removed.

7 Summary of the INVENTION

The invention concerns measures for the improved production of such packs, in particular hinge-lid packs for cigarettes.

The object of the invention is to ensure an improved, in particular fold-free appearance of the outer wrapper, to be precise by virtue of the film being shrunk.

5 In order to achieve this object, the process according to the invention is characterized by the following features:

- a) the outer wrapper consists of a shrink-wrapping film,
- 10 b) the pack provided with the outer wrapper is subjected to a shrink wrapping and/or heat treatment,
- c) prior to the shrink-wrapping treatment, folding tabs of the outer wrapper are connected to one another by large-
15 surface-area heat sealing, and, prior to the heat sealing operation, the folding tabs are (temporarily) fixed in their folding position by tacking.

20 The invention is based on the finding that, upon initiation of the shrink-wrapping and/or heat treatment, the outer wrapper has to be completely finished, that is to say all the folding tabs have to be folded into the correct position and fixed in said position. In order to connect the folding tabs to one another, in particular in the region of the end wall, base wall
25 and side wall, use is made of large-surface-area sealing elements which subject the folding tabs to the action of heat, usually over a large surface area and/or over the entire surface area of the pack, in order to bring about heat sealing of the folding tabs. The shrink-wrapping process of the outer
30 wrapper is initiated in this case. This results, in particular with sealing steps which follow one after the other in time or space, in undesired, permanent deformations of the outer wrapper. In the invention, as a result of the preliminary sealing and/or preliminary tacking, fixing of the outer wrapper
35 in the correct folding position is completed without a shrink-wrapping treatment being initiated by said tacking and/or preliminary sealing. It is then possible for the pack to be subjected directly to a shrink-wrapping treatment or to be sealed over a large surface area in the region of the folding
40 tabs in the conventional manner.

The apparatus according to the invention, as part of a packaging machine, is designed such that arranged upstream of a sealing station and/or sealing subassemblies, for the folding tabs, are tacking elements which bring about tacking and/or preliminary sealing of the folded outer wrapper in the region of the folding tabs.

7 Brief Description of the Drawings

Further details of the invention are explained in more detail below with reference to exemplary embodiments of the pack according to the invention and of an apparatus. In the drawings:

Figure 1 shows a pack, namely a hinge-lid box with ready sealed side tabs,

Figure 2 shows the hinge-lid box according to Figure 1 with ready sealed end tabs and base tabs,

Figure 3 shows the pack with partially folded outer wrapper and tacked side tabs,

Figure 4 shows an illustration corresponding to Figure 3 with likewise tacked side tabs,

Figure 5 shows the pack according to Figure 3 with tacked end tabs and base tabs,

Figure 6 shows a schematic side view of an apparatus for producing and/or sealing and shrink-wrapping an outer wrapper of a pack,

Figure 7 shows a detail of the apparatus according to Figure 6, namely a section along section plane VII-VII of a folding turret,

Figure 8 shows a view of a detail of the apparatus according to Figure 6 in accordance with arrow VIII.

7 Detailed Description of a Preferred Embodiment

The drawings concern a cubical pack 10 of the hinge-lid-box type for cigarettes. The pack 10 comprises a blank of thin

The pack 10 is enclosed by an outer wrapper 13 made of thin film, to be precise a shrink-wrapping film. The outer wrapper 13 forms, in accordance with the configuration of the pack 10, large-surface-area walls, namely a front wall 14 and rear wall 15, narrow, elongate side walls 16 and 17 and an end wall 18 and base wall 19.

The outer wrapper 13 forms folding tabs which are connected to one another by heat sealing. In the region of the side wall 16, side tabs 20 and 21 of the blank of the outer wrapper 13 form a strip-like overlap 22. The latter extends over the entire length of the outer wrapper 13 (Figures 3 and 4). The side tabs 20, 21 are connected to one another by sealing in the region of the overlap 22, to be precise over the entire surface area of the overlap 22, as is illustrated in Figure 1 by the blackened sealing surface areas.

The end wall 18 and base wall 19 likewise comprise folding tabs, to be precise inner transverse tabs 23, 24 and outer, trapezoidal longitudinal tabs 25, 26. The tabs 23...26 partially overlap one another. In Figure 2, the overlap region, and thus the region of the tabs 23...26 which are connected to one another by sealing, is illustrated as a blackened and/or hatched surface area.

Providing the large-surface-area seals in the area of the overlap 22 and of the base wall 19 brings about at least the initiation of the shrink-wrapping process as far as the outer wrapper 13 is concerned. This is disadvantageous, in particular, when the operations of sealing the overlap 22, on the one hand, and sealing the end wall 18 and base wall 19, on the other hand, are carried out in successive steps.

In order to ensure a precise form and position of the outer wrapper 13 despite successive sealing steps, the folding tabs are connected to one another by tacking in preceding steps, the operation of providing the tacking being associated with a small and/or locally limited supply of heat.

First of all, on account of the sequence of folding steps, tacking is provided in the region of the overlap 22 of the side tabs 20, 21. In the exemplary embodiment of Figure 3, said tacking comprises small-surface-area spot seals 27. A plurality of circular or oval spot seals 27 are provided along the (non-folded) overlap 22, to be precise in a spaced apart manner. At least in each case one spot seal 27 is located in the region of those regions of the outer wrapper which project beyond the pack 10 and are intended for forming the transverse tabs 23.

An alternative is shown in Figure 4, to be precise, by a sealing strip 28 which extends over the entire length of the blank and/or of the (non-folded) overlap 22. Said sealing strip is of comparatively narrow width, for example approximately 2 mm. This gives a connection between the side tabs 20, 21 which is sufficient for the rest of the folding process, without the shrink-wrapping process for the outer wrapper 13 being initiated as a result of the supply of heat.

Thereafter, folding of those parts of the outer wrapper which project beyond the pack 10 is completed, the end wall 18 and base wall 19 being formed in the process. In order to fix the folding tabs 23...26, likewise small-surface-area tacking connections produced by heat sealing, namely in each case two tacking strips 29, 30, are provided. These are provided such that all the folding tabs of the end wall 18 and base wall 19 are covered, that is to say are connected to one another locally. This is because the tacking strips 29, 30 are located in a region in which transverse tabs 23 or 24 and the two longitudinal tabs 25, 26 overlap one another in each case.

Following the tacking of the folding tabs 20, 21 and/or 23...26, said regions are sealed in a conventional manner. This brings about, at the same time, shrinkage of the film of the outer wrapper 13. It is additionally possible, however, for the pack 10 to be subjected to a separate shrink-wrapping process.

The operation of providing the tacking connections on the outer wrapper 13 is expediently integrated in the production process

of the outer wrapper 13. The apparatus according to Figure 6 is expediently part of a production line for cigarette packs.

The packs 10, which, with the exception of the outer wrapper 13, have been finished, are supplied on a horizontal pack path 31. The packs 10, which are spaced apart from one another as they arrive, run through a blank unit 32. The latter severs blanks of the outer wrapper 13 from a continuous material web 33. The blanks are held ready in an upright plane, transversely to the pack path 31, by an upright blank conveyor 34, such that the blank of the outer wrapper 13 is folded in the form of a U around the pack 10 conveyed along the pack path 31.

The pack 10 is transferred with the outer wrapper 13 to a folding turret 35. The latter is provided with a plurality of pockets 36, each for receiving one pack 10 with outer wrapper 13, in the present case eight pockets 36 of which in each case two are located in a horizontally directed receiving position and push-out position. The pockets 36 are directed radially and are open on the outside.

When the pack 10 with outer wrapper 13 folded in the form of a U is pushed in, the transverse tabs 24 projecting on both sides of the pack are folded, to be precise, by fixed folding fingers 37 arranged in or on each pocket 36.

By virtue of cyclic rotary movement of the folding turret 35, the packs 10 are conveyed into a first tacking station 38 and then into a second tacking station 39. The first tacking station 38 corresponds to a vertical position of the relevant pocket 36. Upon reaching said first tacking station 38, the side tabs 20, 21 of the outer wrapper 13 have already been folded into a position according to Figures 3 and 4. During the standstill phase, in the tacking station 38, a heated tacking element 40 is moved onto the radially outwardly directed side wall 16 of the pack 10. In this case, sealing tools 41 come into abutment against the side tabs 20, 21, to be precise in the region of the overlap 22. The sealing tools 41 are designed in accordance with the tacking which is to be produced, for example as individual protrusions for spot tacking according to Figure 3 or as a thin, continuous sealing jaw for the exemplary

embodiment according to Figure 4. The tacking element 40 is mounted pivotably on a carrying arm 42.

In the next-following station, the second tacking station 39, the tacking of the side tabs 20, 21 is completed by a correspondingly designed tacking element 43. Two tacking elements and two tacking stations 38, 39 are necessary in particular with short standstill periods of the folding turret 35.

The pack with outer wrapper 13 designed in accordance with Figure 3 or 4 is pushed radially out of the folding turret 35, and into a folding path 45, in the region of a push-out station 44. In the region of said horizontal folding path 45, those parts of the outer wrapper 13 which project on both sides in the region of the end wall 18 and base wall 19 are folded, that is to say first of all, during the push-out operation, the transverse tab 23 is folded by a fixed folding finger 46 and then the two longitudinal tabs 25 and 26 are folded by corresponding folding elements 47, so-called folding diverters.

Following the folding path 45, the pack 10, with the outer wrapper 13 in the completely folded state, passes onto a platform 48. From here, the packs 10 are raised cyclically, forming a pack tower 49 in the process, into the region of a horizontal sealing path 50 located at a correspondingly higher level.

Following the folding path 45, namely on the platform 48, the folds of the end wall 18 and base wall 19 are tacked. In order to provide the tacking connections, namely the tacking strips 29, 30, tacking elements 51, 52 are arranged on both sides of the folding path 45 and/or the platform 48, and each have two spaced-apart tacking jaws 53 corresponding to the form of the tacking strips 29, 30. The tacking elements 51, 52 are moved against the end wall 18 and base wall 19 during the standstill phase of the pack 10.

The pack 10, with the outer wrapper 13 now in the completely tacked state, is subjected to a sealing operation in the conventional manner. In this case, first of all sealing of the

side tabs 20, 21 is completed by a sealing tool 54, which extends vertically over a plurality of, namely three, packs 10 and seals the side tabs 20, 21 during three standstill phases of the packs 10 in the region of the pack tower 49.

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Thereafter, the packs 10 are pushed off transversely into the sealing path 50. Within the latter, the packs 10 are positioned in two rows arranged one above the other. Sealing of the sideways directed end walls 18 and base walls 19 is completed here by sealing jaws 55, to be precise likewise during the respective standstill phases of the packs 10 in a number of sealing cycles.

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During the sealing of the side tabs 20, 21 and/or of the end walls 18 and base walls 19 in steps which follow one after the other in time, it is possible for the shrink-wrapping operation of the outer wrapper 13 to be initiated or carried out in full. In the exemplary embodiment shown, the packs 10 are conveyed through a separate shrink-wrapping station 56 following the sealing of the outer wrapper 13. In the region of said shrink-wrapping station 56, the packs 10 are subjected to the action of heat in the region of the front wall 14 and/or rear wall 15. For this purpose, heating plates 57, 58, 59 are arranged above, beneath and between the rows of packs 10, said heating plates transmitting the shrink-wrapping heat to the pack 10.

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The tacking and sealing temperatures may correspond to one another. A sealing temperature of approximately 145°C is suitable for tacking the folding tabs 20, 21; 23, 24, 25, 26.

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Once it has left the shrink-wrapping station 56, the pack 10 is processed further in a conventional manner.

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The above principle of tacking folding tabs of the outer wrapper 13 before the operation of sealing the same may also be advantageous when shrink-wrapping film is not used.
